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US006624420B1

(12) **United States Patent**
Chai et al.

(10) **Patent No.: US 6,624,420 B1**
(45) **Date of Patent: Sep. 23, 2003**

(54) **LUTETIUM YTTRIUM ORTHOSILICATE SINGLE CRYSTAL SCINTILLATOR DETECTOR**

(75) Inventors: **Bruce H. T. Chai**, Oviedo, FL (US); **Yangyang Ji**, Orlando, FL (US)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/506,160

(22) Filed: Feb. 17, 2000

Related U.S. Application Data

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(51) **Int. Cl.**[7] **G01T 1/202**; C09K 11/08
(52) **U.S. Cl.** ..... **250/361 R**; 252/301.4 F
(58) **Field of Search** ..... 250/361 R; 252/301.4 F

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(57) **ABSTRACT**

A single crystal having the general composition, $Ce_{2x}(Lu_{1-y}Y_y)_{2(1-x)}SiO_5$ where x=approximately 0.00001 to approximately 0.05 and y=approximately 0.0001 to approximately 0.9999; preferably where x ranges from approximately 0.0001 to approximately 0.001 and y ranges from approximately 0.3 to approximately 0.8. The crystal is useful as a scintillation detector responsive to gamma ray or similar high energy radiation. The crystal as scintillation detector has wide application for the use in the fields of physics, chemistry, medicine, geology and cosmology because of its enhanced scintillation response to gamma rays, x-rays, cosmic rays and similar high energy particle radiation.

17 Claims, 5 Drawing Sheets

SCINTILLATING DETECTORS